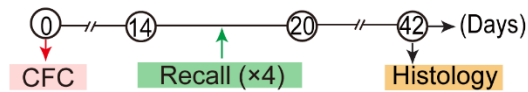


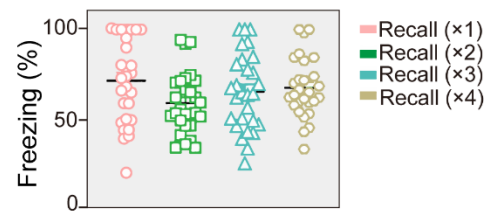
## Supplementary Figure Legends

A

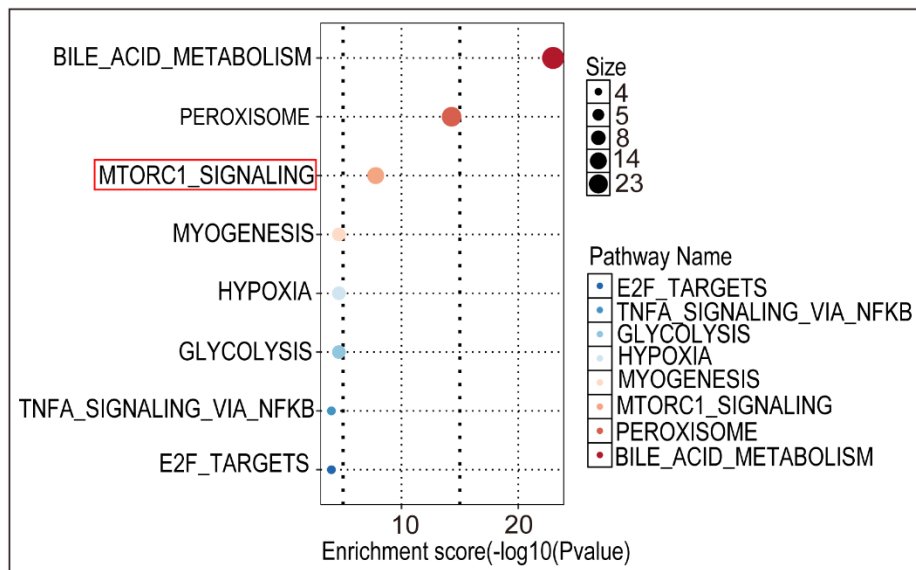
**C57B/L6 / NG2-CreERT; Tau-mGFP**



B



C

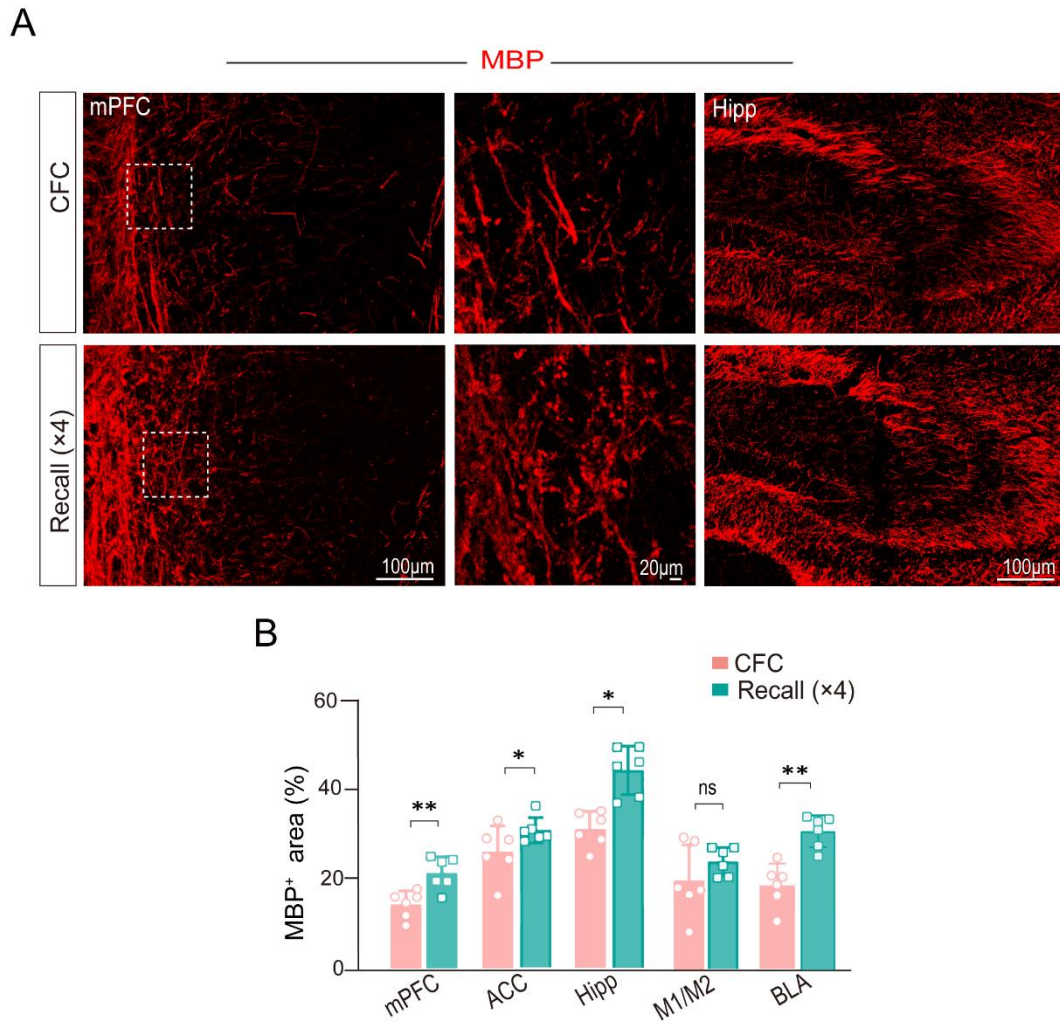


Supplementary Figure 1. Enrichment analysis of repeated fear recall mice.

A. Schematic diagram displaying the time course for repeated recall, behavioral tests, and histology in C57B/L6 mice and NG2-CreERT; Tau-mGFP mice.

B. Freezing time of each memory recall. n=28 mice each recall.

C. Bubble chart showing the enrichment score of the mTOR signaling pathway.

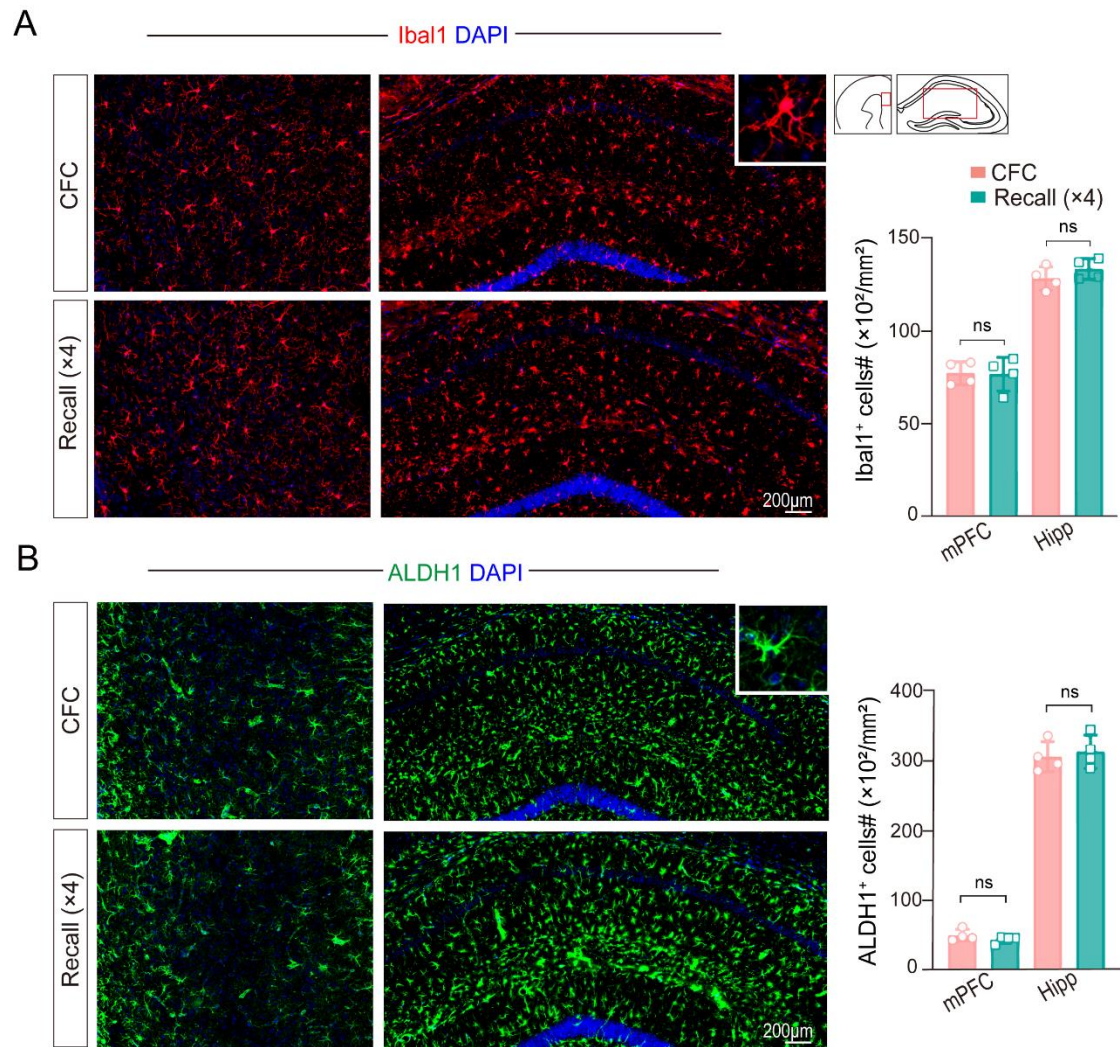


Supplementary Figure 2. Repeated fear recall increase myelin contents in a regional-specific manner.

(A) Representative images of MBP<sup>+</sup> myelin (red) in mPFC and hippocampus area of CFC and Recall (×4) mice.

(B) Quantification of MBP<sup>+</sup> myelin (red) in mPFC and hippocampus area of CFC and Recall (×4) mice. n=6 independent mice for each group.

Data represent mean ± SEM. The unpaired Student's *t* test was used. n.s. indicates no statistical significance, \*  $p < 0.05$ , \*\*  $p < 0.01$ .

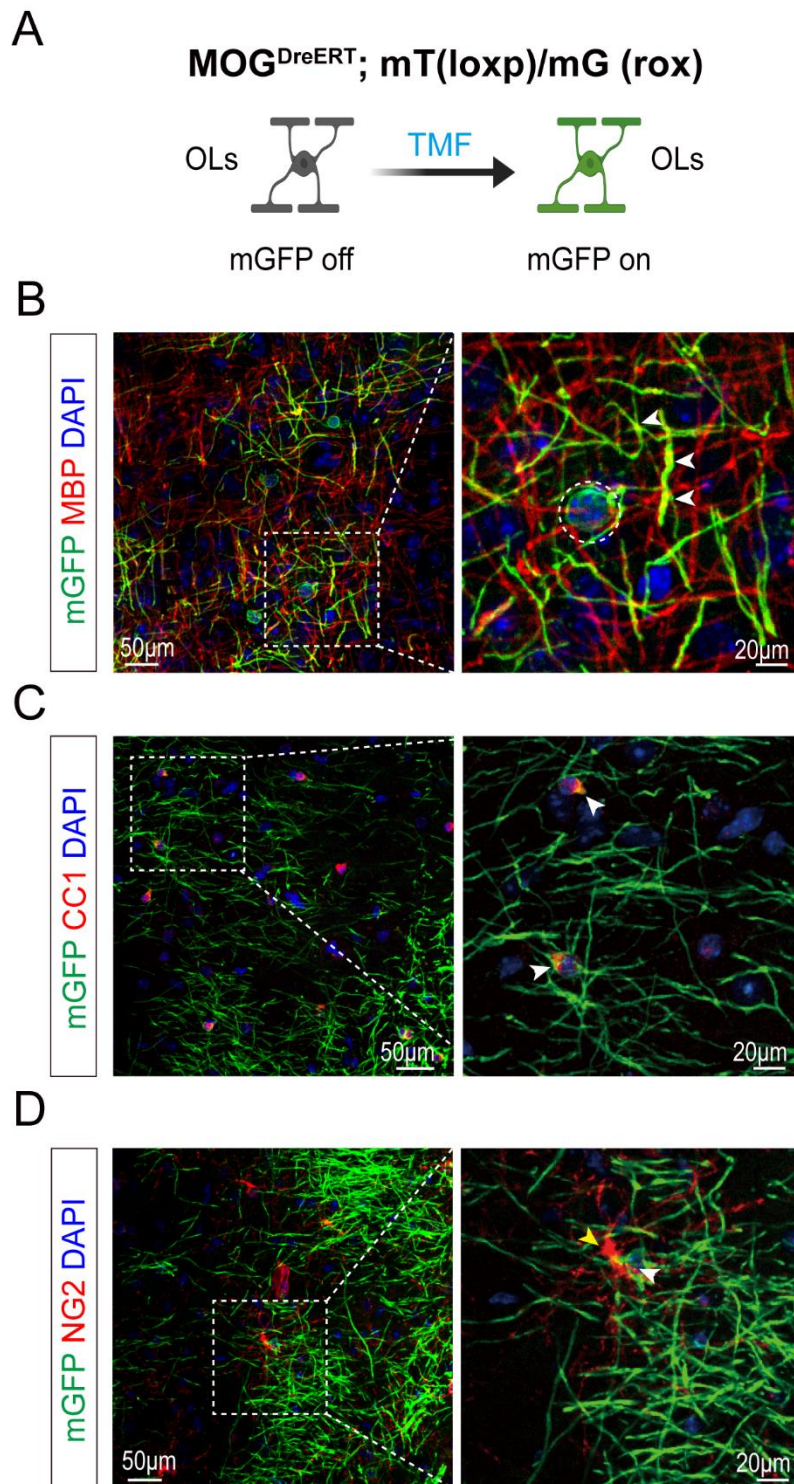


Supplementary Figure 3. Repeated fear recall has no significant effects on other glial cells.

A. Representative images and quantitative analysis of Ibal1<sup>+</sup> microglia (red) in CFC and Recall (x4) mice. Scale bar: 100μm. n=4 independent mice for each group.

B. Representative images and quantitative analysis of ALDH1<sup>+</sup> astrocytes (green) in CFC and Recall (x4) mice. Scale bar: 200μm. n=4 independent mice for each group.

Data represent mean  $\pm$  SEM. The unpaired Student's *t* test was used. n.s. indicates no statistical significance.



Supplementary Figure 4. Identification of MOG-DreERT; mT(loxp)/mG (rox) reporter mice.

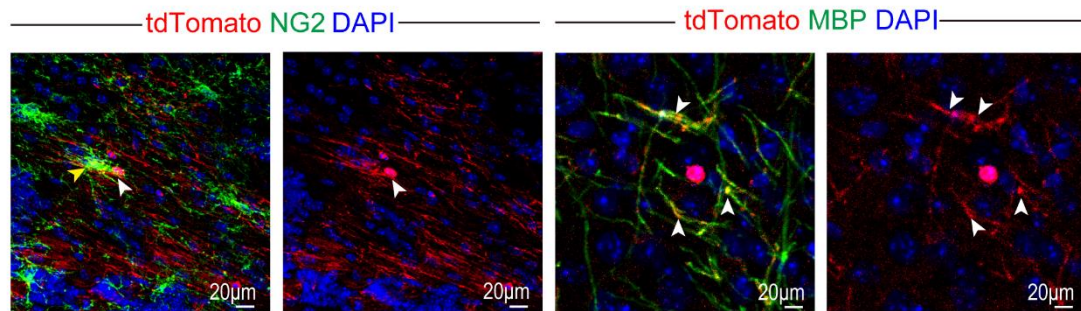
(A) Schematic diagram for labelling of pre-existing myelin in MOG-DreERT; mT(loxp)/mG (rox) line.

(B, C and D) Images showing mGFP<sup>+</sup> signal partially co-labeling with MBP (B) and CC1

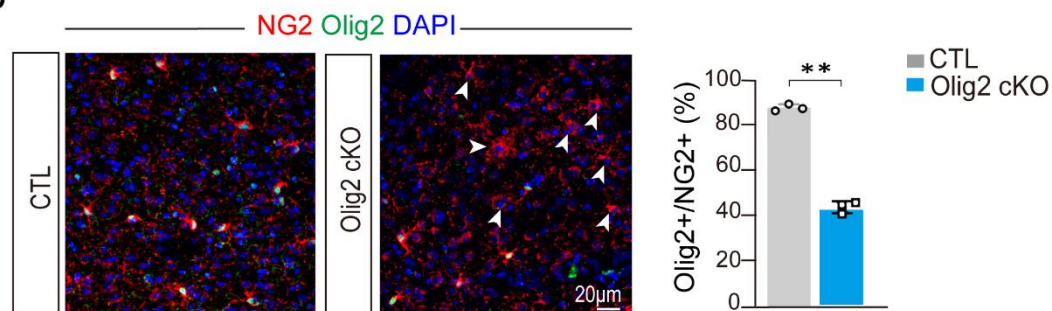
(C), but not with NG2 (D). Right panels are enlarged images in corresponding area in left panels in B-D. Scale bar: 50 $\mu$ m (left panels) and 20  $\mu$ m (right panels).

A

# NG2-CreERT; Tau-DTR-tdTomato



B

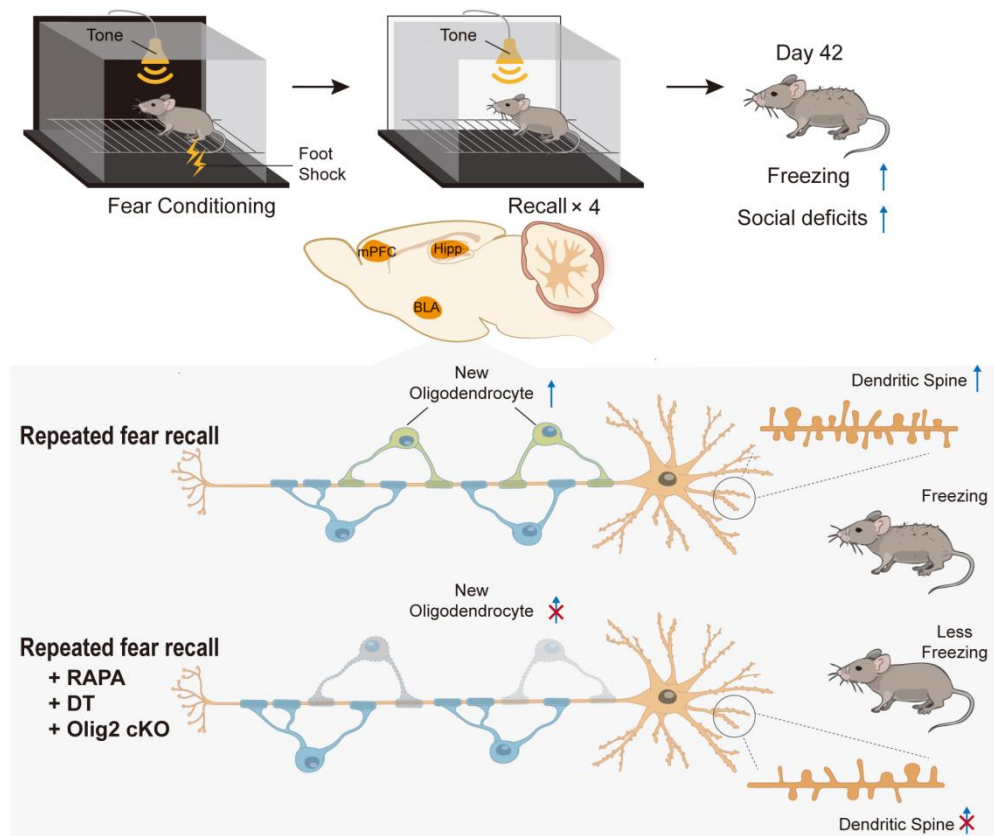


Supplementary Figure 5. Validation of NG2-CreERT; Tau-DTR-tdTomato transgenic mice and efficiency of conditional knockout of NG2-CreERT; Tau-mGFP; Olig2 fl/fl mice.

A. Representative images show tdTomato<sup>+</sup> signal co-labeling with MBP (right panels), but not with NG2 (left panels) in NG2-CreERT; Tau-DTR-tdTomato brains. Scale bars: 20 μm.

B. Representative images of Olig2 (green) expression in NG2<sup>+</sup> OPCs (red) and quantification of the percentage of Olig2<sup>+</sup> cells in NG2<sup>+</sup> cells. Arrows indicating Olig2 negative OPCs. n=3 independent mice per group. The unpaired Student's *t* test was used.

\*\* *p*<0.01.



Supplementary Figure 6. Schematic image summarize the major findings of the present study.